Session 12 Additional Exercise

Problem Statement 1:

A company manufactures LED bulbs with a faulty rate of 30%. If I randomly select 6 chosen LEDs, what is the probability of having 2 faulty LEDs in my sample? Calculate the average value of this process. Also evaluate the standard deviation associated with it.

Solution:

p = Success = 0.7;

q = Failure = 0.3

1. **Calculate Mean**

$\mu = E(x) = n.\ p$

Where:

n = No. of Trials = 6

p = Success ratio = 0.7

∴ Mean = 6*0.7

= 4.2

2. **Standard Deviation**

$$\sigma = \sqrt{npq}$$

Where:

n = No. of selected Leds = 6

p = Success ratio = 0.7

q = Failure ratio= 0.3

∴ Standard Deviation = √6*0.7*0.3

= 1.12

Problem Statement 2:

Gaurav and Barakha are both preparing for entrance exams. Gaurav attempts to solve 8 questions per day with a correction rate of 75%, while Barakha averages around 12 questions per day with a correction rate of 45%. What is the probability that each of them will solve 5 questions correctly? What happens in cases of 4 and 6 correct solutions? What do you infer from it? What are the two main governing factors affecting their ability to solve questions correctly? Give a pictorial representation of the same to validate your answer.

Solution:

Gaurav:

n = 8

p = 0.75

q = 0.25

Barakha:

n = 12

p = 0.45

q = 0.55

Problem Statement 3:

Customers arrive at a rate of 72 per hour to my shop. What is the probability of k customers arriving in 4 minutes?

a) 5 customers, b) not more than 3 customers, c) more than 3 customers.

Give a pictorial representation of the same to validate your answer.

Solution:

Answers is C: more than 3 customers.

60 minutes - 72 customers are arriving

4 minutes - ?

$\frac{4}{60}$ *** 72 = 4.8**

Answer is

Problem Statement 4:

I work as a data analyst in Aeon Learning Pvt. Ltd. After analyzing data, I make reports, where I have the efficiency of entering 77 words per minute with 6 errors per hour. What is the probability that I will commit 2 errors in a 455-word financial report?

What happens when the no. of words increases/decreases (in case of 1000 words, 255 words)? How is the λ affected? How does it influence the PMF? Give a pictorial representation of the same to validate your answer.